

What is Claimed is:

1. A method of fabricating a semiconductor device comprising:
a first step of forming a through hole in a semiconductor element having a plurality of electrodes on a first surface; and
a second step of forming a conductive layer which is electrically connected to the electrodes and is provided from the first surface through an inner wall of the through hole to a second surface of the semiconductor element which is opposite to the first surface,
wherein the conductive layer is formed to have connecting portions on the first and second surfaces so that a distance between at least two electrodes among the plurality of electrodes is different from a distance between the connecting portions on at least one of the first and second surfaces, in the second step.
2. The method of fabricating a semiconductor device as defined in claim 1,
wherein a small hole which has a diameter smaller than a diameter of the through hole is previously formed and enlarged to form the through hole, in the first step.
3. The method of fabricating a semiconductor device as defined in claim 2,
wherein a depression is formed at a position in which the small hole is to be formed.
4. The method of fabricating a semiconductor device as defined in claim 2,
wherein the small hole is formed by a laser beam and the small hole is enlarged by wet etching.
5. The method of fabricating a semiconductor device as defined in claim 1,
wherein a hole communicating with the through hole is formed in each of the electrodes.
6. The method of fabricating a semiconductor device as defined in claim 1,
wherein:
the through hole is formed in an end portion of the semiconductor element; and
the connecting portions are disposed in a center portion of the semiconductor element, on the inside of the through hole.
7. The method of fabricating a semiconductor device as defined in claim 1
further comprising,
a step of forming a stress relieving layer on at least one of the first and second surfaces before the second step,

wherein the conductive layer is formed to reach the stress relieving layer in the second step.

8. The method of fabricating a semiconductor device as defined in claim 7, wherein:

in the step of forming a stress relieving layer, the stress relieving layer comprises a plurality of projections; and

in the second step, the conductive layer is formed to reach the projections.

9. The method of fabricating a semiconductor device as defined in claim 7, wherein:

in the step of forming a stress relieving layer, the stress relieving layer comprises a plurality of projections,

a plurality of recessed portions are formed between the adjacent projections; and

in the second step, the conductive layer is formed to reach the recessed portions.

10. The method of fabricating a semiconductor device as defined in claim 7, wherein the stress relieving layer is formed of a resin.

11. The method of fabricating a semiconductor device as defined in claim 7, wherein the connecting portions are formed on the stress relieving layer.

12. The method of fabricating a semiconductor device as defined in claim 1, wherein a distance between adjacent connecting portions among the connecting portions is wider than a distance between adjacent electrodes among the plurality of electrodes.

13. The method of fabricating a semiconductor device as defined in claim 1, further comprising

a step of providing external terminals at the connecting portions.

14. The method of fabricating a semiconductor device as defined in claim 13, wherein in the step of providing the external terminals, a solder is provided into a thick layer on the connecting portions to form solder balls by wet back.

15. The method of fabricating a semiconductor device as defined in claim 13, wherein a solder is provided on the connecting portions by electroplating or printing.

16. The method of fabricating a semiconductor device as defined in claim 1, further comprising

a step of forming a protective film over an area except at least the connecting portions after the second step.

17. The method of fabricating a semiconductor device as defined in claim 1, further comprising

a step of forming an insulating film over an area including the inner wall of the through hole after the first step and before the second step,

wherein the conductive layer is formed on the insulating film in the second step.

18. The method of fabricating a semiconductor device as defined in claim 17, wherein the insulating film is formed by coating a resin over an area including the inner wall of the through hole.

19. The method of fabricating a semiconductor device as defined in claim 17, wherein:

the through hole is filled with a resin in the step of forming the insulating film; and

the conductive layer is formed within the through hole, through the resin in the second step.

20. The method of fabricating a semiconductor device as defined in claim 1, wherein the semiconductor element is a semiconductor chip.

21. The method of fabricating a semiconductor device as defined in claim 1, wherein the semiconductor element is a part of a semiconductor wafer.

22. The method of fabricating a semiconductor device, comprising, a step of stacking semiconductor devices fabricated by the method as defined in claim 1, and electrically connecting adjacent two semiconductor devices by the conductive layer.

23. The method of fabricating a semiconductor device, comprising the steps of: stacking semiconductor devices fabricated by the method as defined in claim 21, and electrically connecting adjacent two semiconductor devices by the conductive layer; and

cutting the semiconductor wafer into separate pieces.